Keywords for Today’s lesson

What do the following words mean? Relate them digital device and give examples where possible

1. **Transmit**
2. **Component**
3. **Peripheral**
4. **Compatible**
5. **Resolution**
6. **Mechanism**

Keywords for Today’s lesson

What do the following words mean? Relate them digital device and give examples where possible

1. **Transmit** – To send something from one place to another
2. **Component –** Part of a computer
3. **Peripheral –** A Device attached to a digital device
4. **Compatible** – Something able to work without problems
5. **Resolution –** Determining the quality of something
6. **Mechanism** – a piece of machinery or parts working together

Wired Connection Methods

TOPIC 2 – TRANSMITTING DATA

UNIT 1 – INFORMATION TECHNOLOGY SYSTEMS

Wired Connections

Computers transmit data between components and peripherals.

Internally
- transmitting data between the different components

Externally
- transmitting data between an IT system and peripherals.

Types of Wired Connections

1. Think of different wired connections used both internally and externally with digital devices. – **1 min**

2. Pair up and discuss this with a partner **– 2mins**

3. Share your answers with the class

Wired Connections

USB

SATA

VGA

HDMI

Ethernet Cable

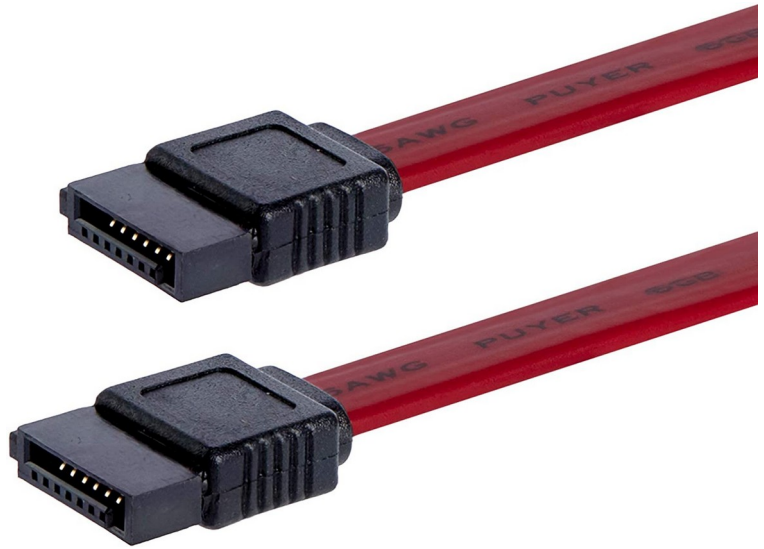
Fibre Optic

USB

- Connection commonly used with peripheral devices.
- It has fast transfer speeds.
- Can connect multiple devices.
- Provides power.
- However, it does have a relatively short range.

SATA

- Commonly used with internal storage devices.
- It is very fast and very compatible with computer systems.
- However, it has a short range and doesn’t supply power.



VGA

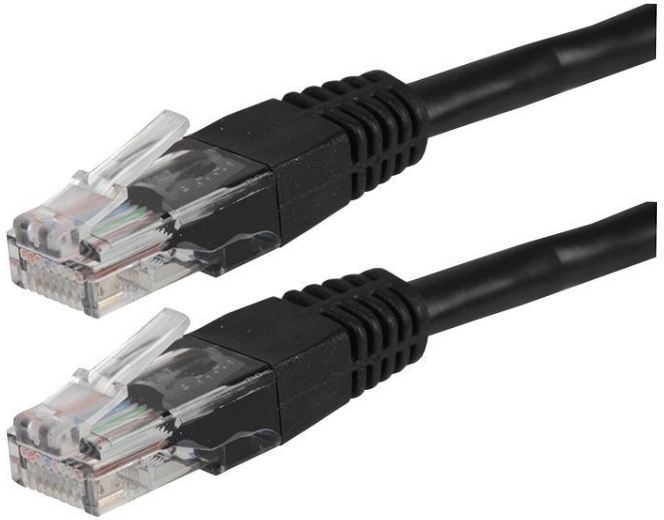
- Used with display devices.
- Compatible with older devices and has built-in locking mechanisms.
- However the signal can degrade easily, it cannot achieve a very high resolution
- Doesn’t include an audio signal.

HDMI

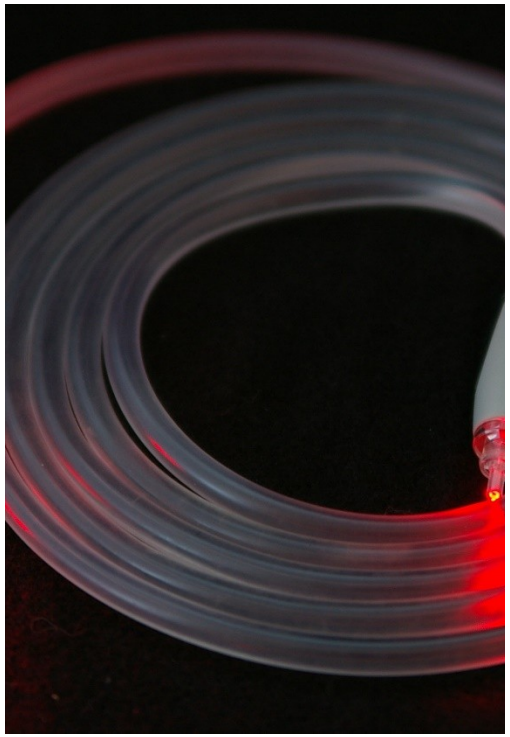
- Connector that is used with display devices.
- Capable of excellent resolutions and transmits an audio signal too.
- It doesn’t have a locking mechanism.

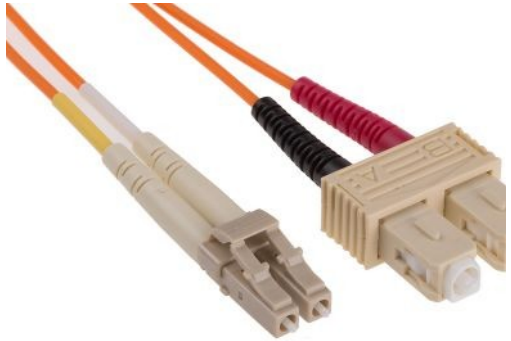
Ethernet

- Transmit data between IT systems, often in a local area network.
- It is very reliable, has a good range and is very compatible with computers.
- It does offer limited mobility
- Not compatible with mobile devices
- Cannot transmit data over very long distances.



Fibre Optic





- Transmitting data between IT systems using light pulses
- Made from reflective glass or plastic fibres.
- It has excellent transfer speeds & range and also is very secure.
- Very expensive.

Notes Activity – 20 mins

1. Look through the PowerPoint on Wired Connections

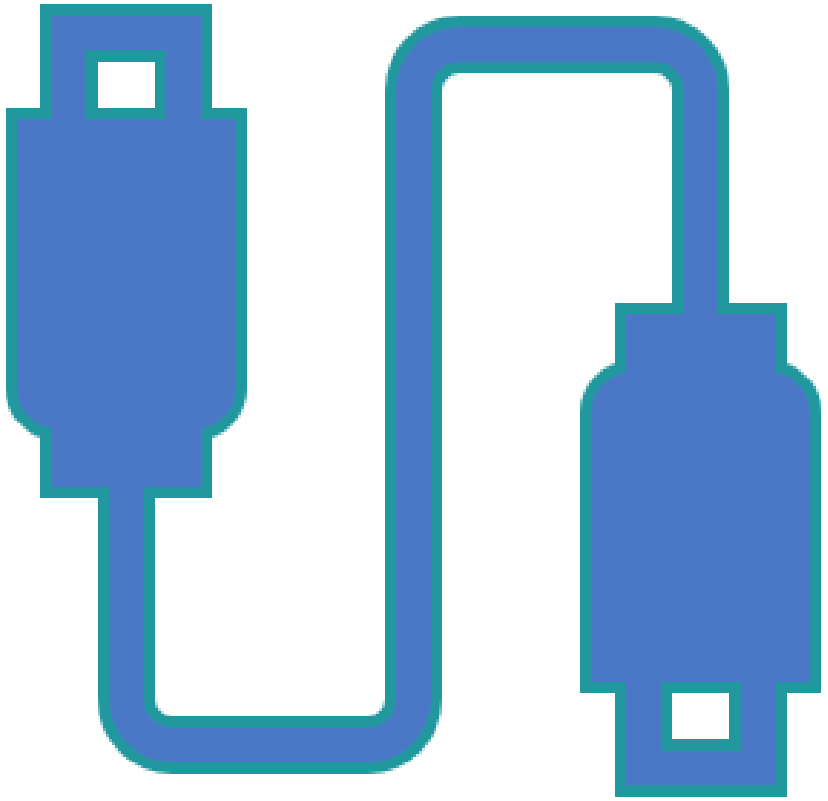
2. Add **additional** notes for each wired connection **- 2 Bullet Points minimum**

3. Add **1 additional advantage** and **1 disadvantage** for each wired connection

USB

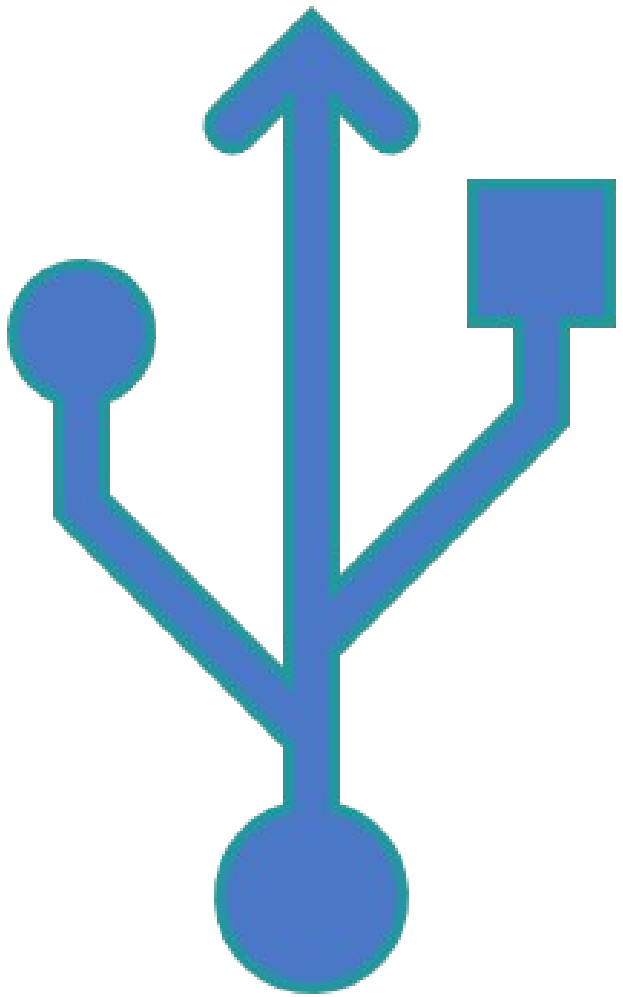
The Universal Serial Bus is a very commonly used wired connection method. We usually use it to connect peripheral devices of all kinds to our computer.

Once upon a time, there was a wide range of methods for connecting peripherals. PS/2 was common for a mouse & keyboard and the parallel port was used for printers for example. Now, however, USB is used almost exclusively for these devices & the majority of other peripherals such as webcams, scanners, good quality audio peripherals & external storage devices.



USB – Advantages

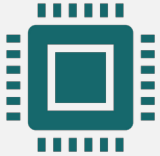
- USB has an excellent data transfer speed. USB 3.0 can transfer 5Gbps. This would let you transfer an HD movie between an external HDD to your computer in seconds.
- You can connect multiple peripherals to a single USB port. It is technically possible to connect 127 different devices to a single USB port.
- USB provides power to the device you are connecting. This means you need not have an external mains power supply to many peripherals when they connect using USB.
- Pretty much every computer system has a USB port. Even USB 3.0 devices are backwards compatible with USB 2.0 ports (and vice versa) to ensure it is compatible with your device.



USB – Disadvantages

- USB has a relatively short range. The maximum practical length of USB 3.0 is just 3 metres.

SATA

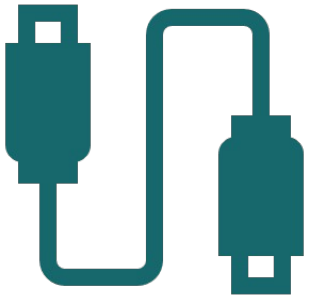


Serial ATA is a method of connecting storage devices to a computer. It has evolved over the years with the current standard being SATA III.

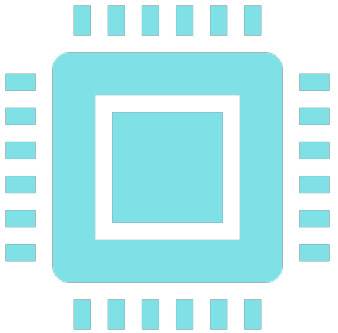
This is very predominately used internally in a computer and is by far the most common connector for internal storage devices.

However, eSATA (external SATA) does exist for connecting an external storage device.

SATA – Advantages



SATA III is an extremely fast connection type, capable of transmitting data at 6Gbps. This is even faster than USB 3.0.

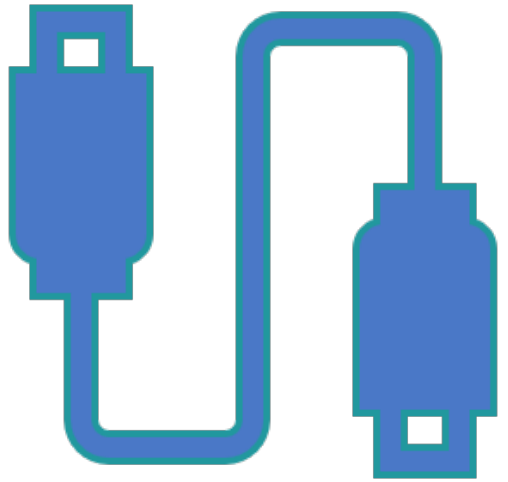


All internal storage devices will have a SATA connector. External storage devices are not very likely to have an eSATA port though.

SATA – Disadvantages

- A SATA cable has a shorter range than even USB 3.0. This isn’t such an issue as we usually only use SATA cables internally, however, eSATA only has a range of 2 metres.

- Unlike USB, SATA doesn’t supply power to a device so a hard drive connecting using it needs an additional power connector.

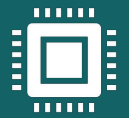


VGA

Visual Graphics Array is a connector used for display devices such as monitors and projectors. You might recognise the familiar chunky blue connector that the VGA cable is known for and may still be used in your school or home PC.

For many years it was the most common connector for connecting display devices to computers. However, it is relatively rare to see nowadays having been replaced by DVI, HDMI & DisplayPort which are capable of handling the much higher quality display expected in modern computing.

VGA – Advantages



technologies that you still often encounter, particularly in the workplace, will be compatible with it.

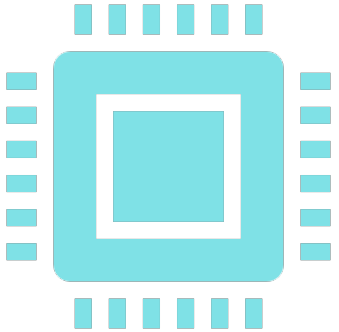
VGA (and DVI) have locking mechanisms built in to ensure the cable remains securely connected.

- Unlike other display connectors like DVI & HDMI, VGA transmits analogue data (as opposed to digital). This means the signal degrades easily due to things like length & analogue to digital conversion.
- VGA cannot handle the same quality resolution as the other digital methods. The latest and most modern versions can handle 1080p HD, but certainly not 4K.
- VGA cannot transfer an audio signal along with the video signal, though neither can DVI. This means you'll require separate audio cables to connect sound.

VGA – Disadvantages

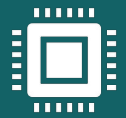
HDMI

HDMI is another method of connecting display devices, such as televisions, monitors and projectors, to a computer.



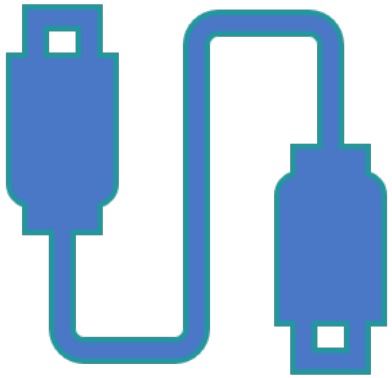
It has largely become the most popular method of connecting display devices to an IT system as it is capable of extremely high-quality resolutions and is quite a small connector, which is great for modern laptops. DisplayPort is an alternative that has some growing popularity with similar output quality.

HDMI – Advantages



HDMI has an extremely high bandwidth of 18Gbps. This allows it to output 4K quality video at 60Hz. This is a very high-quality display output.

An audio signal can be transmitted along with the video signal using HDMI. So separate audio cables are not required if your display has built-in sound.



HDMI – Disadvantages

IT HAS NO LOCKING MECHANISM, SO CABLES CAN FALL OUT OF A DEVICE ACCIDENTALLY.

Ethernet

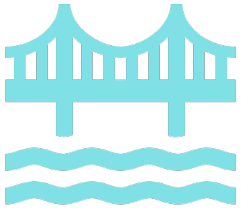
This is a form of UTP/STP cable that is used to transmit data between IT systems.

Most notably this is used in the workplace to create a Local Area Network to allow the sharing of resources within a business. We also use it in the home to connect our PC to a router/modem for wired internet access.

When it comes to networking there are few wired alternatives to ethernet cables. However WiFi can be used as a wireless alternative in many places.

Ethernet – Advantages

It is a very reliable connection method. Unlike WiFi, it isn’t a shared medium so bandwidth isn’t split across multiple users and it is also not very susceptible to interference.



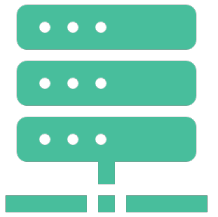
It has a very good range compared to most other cables. It can transfer data 100 metres. This is especially good due it being able to transfer as much as 1000Mbps.

It is extremely common in most types of computers to have an ethernet port.

HDMI – Disadvantages

Compared to WiFi it offers limited mobility as you need to have a physical wire running from your computer to the connection point.

You rarely find an ethernet port in mobile devices and it is becoming less common in laptops too.



It cannot transfer data over very long distances, and so, is of no use to very large networks.

Fibre Optic

Fibre optic cable is a connection method where data is transferred through the use of pulses of light. The cable itself is made of tiny reflective glass or plastic fibres. The light pulses bounce off the reflective surface to transmit down the cable.

This is used to provide super-fast broadband connections to home and businesses. Generally, we see it used at the centre of our telephone communications network. It can also be used for networking within a business either within a building or between buildings, though this is quite rare due to cost.

Fibre Optic – Advantages

Exceptionally good data transfer speeds are probably it’s biggest benefit. Around 100Gbps is generally what we identify as the max speed of fibre optic cable, though much faster is theoretically possible.

It also has an excellent range. Transferring data over a distance of 100km is possible with fibre optic cables.

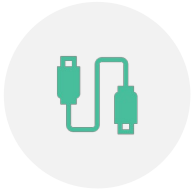
It is a very secure connection method as it is not susceptible to interference or generating noise and cannot be tapped to intercept data.

Fibre Optic – Disadvantages

It is very expensive. Technically the cable itself on a per distance basis isn’t expensive but the extra equipment required to run the network makes it much more costly.

data over very long distances, and so, is of no use to very large networks.

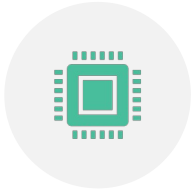
Wired Connection Summary



USB is a connector that is very commonly used with peripheral devices. It has fast transfer speeds, can connect multiple devices, provides power and is very compatible with computers. However, it does have a relatively short range.

VGA is a connector that is used with display devices. It is compatible with older devices and has built-in locking mechanisms. However the signal can degrade easily, it cannot achieve a very high resolution and doesn’t include an audio signal.

Ethernet cable is used to transmit data between IT systems, often in a local area network. It is very reliable, has a good range and is very compatible with computers. It does offer limited mobility, is often not compatible with mobile devices and cannot transmit data over very long distances.



SATA is a connector that is most commonly used with internal storage devices but can work with external ones. It is very fast and very compatible with computer systems. However, it has a short range and doesn’t supply power.

HDMI is another connector that is used with display devices. It is capable of excellent resolutions and transmits an audio signal too. However, it doesn’t have a locking mechanism.

Fibre optic cable is a method of transmitting data between IT systems that is commonly seen used as part of the telephone network. It has excellent transfer speeds & range and also is very secure. However, it is very expensive.